Adapting Canada's Built Legacy Webinar Series
Part 2: September 9, 2025
Session Abstracts

Session 1: Practical Building Enclosure Retrofit Thermal and Embodied Analysis for War Memorial Children's Hospital Conversion to Supportive Housing

Emma Cubitt & Randy Van Straaten

Emma will present the project, its goals, and the challenges presented in designing the wall assembly retrofit design.Randy will start by providing a basis for the evaluation of the thermal and embodied carbon performance of the assemblies. The methodology involves calculating clear wall assembly R-values and presenting the analysis with corresponding clear field assembly embodied carbon values. The performance is reviewed and optimizations are evaluated. Next, effective (or whole wall) R-value are calculated by addressing linear transmittance of thermal bridges for a typical elevation area. He will then step through the baseline results for various assemblies paired with recommendations for improving performance. He will further present the accumulative impacts and identify current limitations with the approach and thoughts on addressing these in future projects. Emma will conclude the presentation by providing reflections on the process and the value provided to the project team.

Session 2: The Art and Science of Stereotomy – An Organic Holistic Technology

Patrick Moore

Stereotomy, done manually, is an art and science for drawing, or more precisely, a way of representing volumes in depth. Stereotomy has been used by over a millennium in different countries and by practicing these manual drawings techniques has contributed to the cultivation of unique architectural and cultural heritage. French carpenters call stereotomy ‘L’Art du Trait’, German “Schiftung” and Japanese “Kiku-jutsu”. Each culture using stereotomy manually in a very unique, but similar way, to create and represent their own well defined architectural cultural styles. The development of these 2D drawing techniques gave rise to their own unique cultural identity. Stereotomy is a method for using systematic geometric construction drawings to present architectural details in three dimensions, achieving a kind of “objectification of craftsmanship.”Due to large societal shifts largely from the industrial revolution, stereotomy as a knowledge sphere became sealed within traditional architectural craftsmanship; nevertheless, it was still passed down without interruption. Apprentice practitioners of practical stereotomy become knowledgeable through hands-on experience of a process which makes the most complex designs very manageable. In truth, the experience of this approach not only provides craftspeople with new skills and enhances those they already possess, but in fact transforms them in a more profound way. They begin not only to do things differently and think differently, but indeed to see differently.

Session 3: Basilique Notre-Dame de Montréal - Réfection des tours et clochers

Daniel Durand & Jean-Philippe Ouellette

Depuis quarante ans, la basilique et les tours des clochers ont fait l'objet de plusieurs travaux de restauration pour contrer plus particulièrement le problème de la fissuration des pierres calcaires. Ces campagnes de travaux ont été menées sans que vraiment ne soient approfondis les causes à l'origine des détériorations.Une quinzaine d'années sépare la construction du volume de la basilique, terminée en 1829, de celle des deux tours, complétées en 1843. La provenance des pierres utilisées dans ces deux étapes de la construction de la basilique diffère. Déjà en 1929, l'abbé Olivier Maurault rapporte un commentaire à l'effet d'une moindre qualité de la pierre des tours. Nous avons pu valider ceci lors de nos inspections des tours. À partir d'un certain niveau, un grand nombre de pierres sont posées en délit et comportent une quantité importante de microfissures et fractures. Le problème a été assurément noté lors de travaux de conservation des années 1980, où l'on a procédé à l'injection d'époxy qui fut retiré au début des années 2000 par un bouchardage des fissures colmatées. Aucune mention des phénomènes en cause n'est rapportée dans les documents de l'époque.Une inspection attentive a révélé que les pierres de 180 ans des tours avaient atteint un niveau de dégradation qui nécessitait leur remplacement sur une grande hauteur. De plus, les conditions environnementales sévères auxquels sont exposées les tours ont accentué les phénomènes d'érosion et dommages causés par les infiltrations d'eau dans les fissures et joints de mortier. Lors des travaux de restauration effectués sur la tour Ouest dont le remplacement d'une grande quantité de pierres, on a constaté une plus grande fragilité et le réseau des microfissures au sein des pierres. L'inspection de la tour Est a montré des détériorations encore plus marquées. Des hypothèses à l'effet de mouvements structuraux émanant des pressions de vent ou des cloches ont été émises. Il a été considéré aussi que l'utilisation d'un mortier plus résistant que la pierre soit la cause. Des échantillons ont été analysés et des tests de résonance ont été conduits. Le modèle mathématique de la façade et des tours a permis d'en évaluer le comportement structural sans toutefois pouvoir identifier une explication de l'endommagement de la maçonnerie. Au stade actuel de nos investigations, nous retenons des facteurs multiples dont possiblement la composition de la pierre calcaire des tours qui comporte un taux élevé d'allochèmes (éléments étrangers et fossiles au sein d'une roche) qui pourrait affecter le comportement structural de la pierre et sa dureté.La présentation soulignera comment l'apport des observations in situ et en chantier, ainsi que les analyses théoriques et en laboratoire ont permis d'élaborer une hypothèse plausible des causes des détériorations particulières aux deux tours de la basilique.

Session 4: Using structural health monitoring in historic religious sites with limited funding to guide and assess conservation efforts: a case study of the Cathedral of the Immaculate Conception

Alex R. Carpenter

Historic places of faith contain vast open spaces, high vaulted ceilings, slender towers and spires, and intricate detailing—awe-inspiring elements that can become concerns for structural stability. As users, these places desire to remain open and focus their financial resources on their mission statements, rather than their buildings. These pose challenging conditions for building professionals conserving the site. The recent collapse of an 1850's New London, Connecticut steeple and subsequent demolition of the church highlights a need to implement a monitoring system in these heritage buildings. The use of structural health monitoring (SHM) can provide early warning systems for structures at risk of failure and inform conservation for buildings with limited funding, allowing for more targeted conservation efforts that enable minimal changes to the historic fabric while confirming the success of interventions.This presentation touches upon the unique considerations involved in conserving historic places of faith before delving into the use of SHM in these structures to inform and assess conservation. The discussion is placed into context through a case study of the Cathedral of the Immaculate Conception, Saint John, NB, covering the current state of the structure, sensor selection and implementation, planned conservation works, and an assessment of the emergency stabilization efforts. While the church serves a wide catchment area, this cathedral is located in a community with a child poverty rate of 23.1% according to the 2017 Statistics Canada census on children in low-income households. The Cathedral of the Immaculate Conception prioritizes financial resources used to serve the surrounding community and has a limited budget for building conservation. This is further complicated by interventions over the past 8 decades, introducing multiple concrete systems and steel structures inside the bell tower to reinforce the stone masonry walls and the spire's central timber mast. Other areas of structural concern include cracking near the bell tower's eastern pinnacles, cracking near a front façade pinnacle presently restrained by three metal bands, and moisture build-up in the interior bell tower. To ensure the most effective use of finances, a long-term SHM system is being implemented to inform and assess conservation efforts. Phase 1 of the sensor implementation, installed in December 2023, serves as an early warning system to assess the stability of the structure. Phase 2 is set to be installed in May 2024, monitoring additional areas with structural concerns while working towards a more comprehensive global understanding of the structure. Both phases will be used to monitor the emergency stabilization efforts taking place during spring and summer 2024, with the results of the conservation efforts discussed as a part of this presentation.